R E M A R K S

The Office Action dated August 22, 2001, presents the examination of claims 6-9 and 12-13. Non-elected claims 1-5, 10-11, and 14-15 are canceled. Claims 6 and 7 are amended. Claims 8 and 13 are deleted. Claims 16 and 17 are added. Support for claim 16 is found in original claims 6 and 8, and support for claim 17 is found in original claim 13. No new matter is inserted into the application.

Interview

Applicants' representative thanks the Examiner and Supervisory Examiner for the helpful personal Interview held at the United States Patent and Trademark Office on October 22, 2002.

Rejection under 35 U.S.C. § 102(b)

The Examiner maintains the rejection of claims 7 and 12 under 35 U.S.C. § 102(b) for allegedly being anticipated by Nakao et al. (*Cancer Res.* 55:4248-4252). Applicants respectfully traverse. Reconsideration of the claims and withdrawal of the instant rejection are respectfully requested.

In the Reply filed on February 22, 2002, Applicants argued that the purification limit recited in claim 7 excluded the peptides

disclosed by Nakao et al., since Nakao et al. did not isolate any of the peptides in the HPLC fractions. In response, the Examiner argues the separation of peptides on HPLC meets the purification limit of the claims.

In response to the Examiner's remarks, Applicants amend claim 7 to delete "purified" and substitute therefor "chemically synthesized." Support for this amendment to claim 7 is found in the specification. In particular, the chemical synthesis of peptides is described on page 17, lines 12-24, wherein it is stated that a peptide can be synthesized by usual methods known in peptide chemistry. As acknowledged by the Examiner during the Interview, the peptides disclosed in Nakao et al. are not chemically synthesized.

As such, Nakao et al. fails to describe each and every element of claim 7 and therefore fails to anticipate claim 7 (and dependent claim 12) under 35 U.S.C. § 102. Withdrawal of the instant rejection is therefore respectfully requested.

Rejection under 35 U.S.C. § 112, first paragraph

The Examiner rejects claims 6-9 and 12-13 under 35 U.S.C. § 112, first paragraph for allegedly not being described by the specification. Applicants respectfully traverse. Reconsideration

of the claims and withdrawal of the instant rejection are respectfully requested.

First, the Examiner asserts that the limitation of "a protein of about 800 amino acids" is new matter. This phrase is deleted from claim 6 therefore rendering this issue moot.

Second, the Examiner maintains his rejection that section (c) of claim 6 contains subject matter not described in the specification. Although the Examiner acquiesces that the specification discloses one protein (SEQ ID NO:2), he points out that the specification does not disclose any other protein of about 800 amino acids that has the required function recited in claim 6(c).

In response to this rejection, Applicants first make note that section (c) of claim 6 is deleted. Therefore, this rejection is no longer applicable to pending claims 6, 7, 9, and 12 and should be withdrawn.

Applicants submit new claim 16 which contains the deleted subject matter of claim 6(c), and further recites subject matter from the canceled claim 8. Therefore, claim 16 is supported by original claims 6 and 8, as well as the specification, and as such does not introduce any new matter into the application.

Claim 16 is directed to an isolated tumor antigen protein which is encoded by a DNA which hybridizes to SEQ ID NO:1 under stringent hybridization conditions comprising 6xSSC, 50% formamide, and 0.5% SDS and a temperature of 42°C, wherein said tumor antigen protein comprises the amino acid sequence of positions 749-757, 736-744, 785-793, or 690-698 in the amino acid sequence of SEQ ID NO:2, and wherein said protein yields, through intracellular decomposition, peptide fragment(s) which binds to major histocompatibility complex (MHC) class I antigen and is recognized by cytotoxic T lymphocytes (CTLs) in such binding state.

Applicants acknowledge that claim 16 encompasses a genus of proteins. However, Examiner seems to take the position that a genus of proteins falling within the scope of claim 16 is not described in the specification. Applicants respectfully disagree for the following reasons.

First, Applicants respectfully point out that the disclosure of one sequence (e.g., SEQ ID NO:2) serves as adequate written description for a genus of compounds. As support for this position, Applicants point to Example 9 of the Written Description Training Materials. This Example analyzes written description for a claim reciting isolated nucleic acids that specifically hybridize under highly stringent conditions to the complement of SEQ ID NO:1. It is

noted in the analysis that only a *single species* (e.g., SEQ ID NO:1) falling within the scope of the claimed genus is disclosed.

In the analysis of Example 9, it is clearly stated that in analyzing a genus, a person skilled in the art would not expect substantial variation among species encompassed by hybridization conditions which result in structurally similar DNAs. The analysis concludes that the claimed invention is adequately described. In other words, the disclosure of a single species serves as adequate written description for a genus of compounds.

The claim recited in Example 9 is equivalent to the instant claim 16. Both recite highly stringent hybridization conditions and a function for the claimed protein. Both claim sequences which are defined by their ability to hybridize to a disclosed SEQ ID NO. As such, the Examiner's request *in this application* for the disclosure of a second species within the claimed genus is in clear contradiction to Example 9 of the Written Description Training Materials and is beyond what is required for the claims to comply with 35 U.S.C. § 112, first paragraph. The rejection is therefore improper, and withdrawal thereof based upon this fact is requested.

Second, the Inventors actually obtained another species falling within the scope of claim 16 which is disclosed in the specification. Specifically, this second species which hybridizes

to SEQ ID NO:1 is disclosed on page 34, lines 9-19 of the specification, as follows:

> Furthermore, cDNA library derived from normal human tissue (peripheral blood lymphocyte) was also screened in the manner as described above. **This screening resulting in cloning of a recombinant plasmid into which cDNA of about 2.5 kb has been incorporated.** It was found by determining the base sequence of this cDNA that **cDNA thus cloned was the same as that shown in SEQ ID NO:1[1] except for position 812 (position 812 for normal human tissue was T).** It was thus indicated that in connection with the full-length gene comprising the gene encoding the tumor antigen protein of the present invention, almost the same genes are expressed in both cancer cells and normal human tissue.

The above disclosure demonstrates that a second species was actually isolated by the Inventors and described in the specification. The second species differs from the first species by one nucleotide, but has the exact same amino acid sequence (SEQ ID NO: 2). Accordingly, the second species must have the same activity as the first clone, which activity is recited in claim 16. The second species is encoded by a nucleotide sequence that hybridizes to SEQ ID NO:1, because the nucleotide sequence is the same as SEQ ID NO:1 except for one nucleotide.

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[1] In the original specification, SEQ ID NO: 1 was originally described as SEQ ID NO: 2. It was amended to SEQ ID NO: 1 in the Sequence Listings filed after the filing date.

Third, claim 16 also describes the claimed peptides structurally. As suggested by the Supervisory Examiner during the interview, the claim recites that the claimed peptides comprise the amino acid sequence of positions 749-757, 736-744, 785-793, or 690-698 in the amino acid sequence of SEQ ID NO:2. Support for this limitation to claim 16 is found in original claim 8 and in the specification, such as on page 18, lines 8-19.

In total, then, the claimed protein is limited by the following: (1) it must be encoded by a DNA which hybridizes to SEQ ID NO:1 under stringent hybridization conditions comprising 6xSSC, 50% formamide, and 0.5% SDS and a temperature of 42^{0}C, (2) it must comprise the amino acid sequence of positions 749-757, 736-744, 785-793, or 690-698 in the amino acid sequence of SEQ ID NO:2, and (3) it must have the function of yielding, through intracellular decomposition, peptide fragment(s) which binds to major histocompatibility complex (MHC) class I antigen and is recognized by cytotoxic T lymphocytes (CTLs) in such binding state. It is clear that these limitations on the claim clearly define the genus of tumor antigen proteins encompassed by the claim, such that the Inventors were in possession of the invention at the time of filing of the application. The requirements of 35 U.S.C. § 112, first

paragraph, written description, are therefore clearly met in the instant case.

Summary

All of the present claims define patentable subject matter such that this application should be placed into condition for allowance. The Examiner is respectfully requested to issue a Notice of Allowability indicating that claims 6-7, 9, 12, and 16-17 are allowed.

If there are any issues remaining that may be solved through a telephone conversation, the Examiner is respectfully requested to contact Kristi L. Rupert, Ph.D. (Reg. No. 45,702) at 703-205-8000.

Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants hereby petition for an extension of two (2) months to November 20, 2002 in which to file a reply to the Office Action. The required fee of $400.00 is enclosed herewith.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees

required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made

Version with Markings to Show Changes Made

IN THE CLAIMS:

The claims have been amended as follows:

Claim 6 (Four Times Amended)

An isolated tumor antigen protein selected from the group consisting of:

(a) a protein comprising an amino acid sequence shown in SEQ ID NO:2; and

(b) a protein encoded by a DNA comprising a nucleotide sequence shown in SEQ ID NO:1[; and

(c) a protein of about 800 amino acids which is encoded by a DNA which hybridizes to SEQ ID NO:1 under stringent hybridization conditions comprising 6xSSC, 50% formamide, and 0.5% SDS and a temperature of 42°C],

wherein said protein yields, through intracellular decomposition, peptide fragment(s) which binds to major histocompatibility complex (MHC) class I antigen and is recognized by cytotoxic T lymphocytes (CTLs) in such binding state.

Claim 7 (Three Times Amended)

An isolated and [purified] chemically synthesized tumor antigen peptide that is a peptide fragment of [the protein of claim 6] a tumor antigen protein selected from the group consisting of:

(a) a protein comprising an amino acid sequence shown in SEQ ID NO:2; and

(b) a protein encoded by a DNA comprising a nucleotide sequence shown in SEQ ID NO:1,

wherein said tumor antigen peptide comprises the amino acid sequence of positions 749-757, 736-744, 785-793, or 690-698 in the amino acid sequence of SEQ ID NO:2, and [which] binds to MHC class I antigen and is recognized by CTLs when bound to MHC class I antigen.

Claims 1-5, 8, 10-11, and 13-15 are canceled.

Claims 16 and 17 are added.